

CORRESPONDENCE ON ELECTRICITY

FROM THE "PHILOSOPHICAL MAGAZINE/' ETC.

*On a peculiar Voltaic Condition of Iron, by Professor SCHOENBEINT, of Bale ; in a Letter to Mr. Faraday: with further Experiments on the same subject, by Mr. FARADAY, communicated in a Letter to Mr. Phillips.*¹

To Michael Faraday, D.C.L., F.R.S., etc.

SIR,—As our continental and particularly German periodicals are rather slow in publishing scientific papers, and as I am anxious to make you as soon as possible acquainted with some new electro-chemical phenomena lately observed by me, I take the liberty to state them to you by writing. Being tempted to do so only by scientific motives, I entertain the flattering hope that the contents of my letter will be received by you with kindness. The facts I am about laying before you seem to me not only to be new, but at the same time deserving the attention of chemical philosophers. *Les void.*

If one of the ends of an iron wire be made red hot, and after cooling be immersed in nitric acid, sp. gr. 1.35, neither the end in question nor any other part of the wire will be affected, whilst the acid of the said strength is well known to act rather violently upon common iron. To see how far the influence of the oxidised end of the wire goes, I took an iron wire of 50' in length and 0" .5 in thickness, heated one of its ends about 3" in length, immersed it in the acid of the strength above mentioned, and afterwards put the other end into the same fluid. No action of the acid upon the iron took place. From a similar experiment made upon a cylindrical iron bar of 16' in length and 4" ' diameter the same result was obtained. The limits of this protecting influence of oxide of iron with regard to quantities I have not yet ascertained; but as to the influence of heat, I found that above the temperature of about 75° the acid acts in the common way upon iron, and in the same manner also, at common temperatures, when the said acid contains water

¹ *Land, and Edinb. Phil. Mag.*, 1836, vol. ix. p. 53.